

D. The Commission Should Reject Collateral Attacks On LEC Participation In New Technologies.

Two parties suggest that the Commission should limit LEC participation in new technologies. Suite 12 says that incumbent spectrum users, including LECs, should be barred from controlling LMDS licenses (p. 13). Cellular Service, Inc. seeks to limit LECs' abilities to acquire PCS licenses outside their service areas (p. 14).

These naked power grabs to exclude competitors are self-serving and should be rejected.

VI. CONCLUSION.

The modified Milgrom-Wilson auction design is best because it is fair, efficient, and properly paced. It will favor no one, will award licenses to those that value them the most, and will produce the most revenues for the Treasury.

Respectfully submitted,

PACIFIC BELL  
NEVADA BELL

A handwritten signature in cursive script, appearing to read "James P. Tuthill", written over a horizontal line.

JAMES P. TUTHILL  
THERESA L. CABRAL  
BETSY STOVER GRANGER

140 New Montgomery St., Rm. 1529  
San Francisco, California 94105  
(415) 542-7664

JAMES L. WURTZ

1275 Pennsylvania Avenue, N.W.  
Washington, D.C. 20004  
(202) 383-6472

Their Attorneys

Date: November 30, 1993

CERTIFICATE OF SERVICE

I, Marcia Kwan, certify that the following is true and correct:

I am a citizen of the United States, State of California and over eighteen years of age.

My business address is 140 New Montgomery Street, San Francisco, CA 94105.

On November 30, 1993, I served the attached "Reply Comments of Pacific Bell and Nevada Bell" by placing true copies thereof in envelopes addressed to the parties in the attached list which envelopes, with postage thereon fully prepaid. I then sealed and deposited in a mailbox regularly maintained by the United States Government in the City and County of San Francisco, State of California.

PACIFIC BELL  
140 New Montgomery Street  
Room 2501  
San Francisco, CA 94105

By: Marcia Kwan  
Marcia Kwan

SERVICE LIST  
PP DOCKET NO. 93-253

John D. Pellegrin  
ABRAHAM KYE  
1140 Connecticut Avenue, N.W.  
Suite 606  
Washington, D.C. 20036

Alan R. Shark  
AMERICAN MOBILE TELECOMMUNICATIONS  
ASSOCIATION, INC.  
1835 K Street, N.W., Suite 203  
Washington, D.C. 20006

Robert B. Kelly  
ADVANCED MOBILECOMM TECHNOLOGIES, INC.  
DIGITAL SPREAD SPECTRUM TECHNOLOGIES,  
INC.  
Kelly, Hunter, Mow & Povich, P.C.  
1133 Connecticut Avenue, N.W.  
Washington, D.C. 20036

Kurt A. Wimmer  
AMERICAN PERSONAL COMMUNICATIONS  
1201 Pennsylvania Avenue, N.W.  
P.O. Box 7566  
Washington, D.C. 20044

Robert J. Miller  
ALCATEL NETWORK SYSTEMS, INC.  
Gardere & Wyne, L.L.P.  
1601 Elm Street, Suite 3000  
Dallas, Texas 75201

Wayne Black  
AMERICAN PETROLEUM INSTITUTE  
Keller and Heckman  
1001 G Street, N.W.  
Suite 500 West  
Washington, D.C. 20001

Curtis White  
ALLIANCE FOR FAIRNESS AND VIABLE  
OPPORTUNITY  
1920 L Street, NW  
Suite 700  
Washington, D.C. 20036

Charles N. Andreae, III  
ANDREA & ASSOCIATES, INC.  
1133 Connecticut Ave., Suite 700  
Washington, D.C. 20036

William D. Jimerson  
ALLIANCE TELCOM, INC.  
34 Woodbine Rd.  
Pittsford, NY 15534

Alane C. Weixel  
ANCHORAGE TELEPHONE UTILITY  
Covington & Burling  
1201 Pennsylvania, Ave., N.W.  
P.O. Box 7566  
Washington, D.C. 20044

Lon C. Levin  
AMSC SUBSIDIARY CORPORATION  
10802 Park Ridge Boulevard  
Reston, Virginia 22091

Eliot J. Greenwald  
JOHN G. ANDRIKOPOULOS, et al.  
Fisher, Wayland, Cooper and Leader  
1255 23rd Street, N.W.  
Suite 800  
Washington, D.C. 20037

Julian P. Gehman  
AMERICAN AUTOMOBILE ASSOCIATION,  
INC.  
Blooston, Mordkofsky, Jackson  
& Dickens  
2120 L Street, N.W. Suite 300  
Washington, D.C. 20037

John P. Bankson, Jr.  
ANDREA L. JOHNSON  
Hopkins & Sutter  
888 Sixteenth Street, N.W.  
Washington, D.C. 20006

ARCH COMMUNICATIONS GROUP  
1800 West Park Drive  
Suite 250  
Westborough, MA 10581

Francine J. Berry  
AMERICAN TELEPHONE & TELEGRAPH  
COMPANY  
295 North Maple Avenue  
Room 3244J1  
Basking Ridge, NJ 07920

Pamela L. Gist  
ALLIANCE OF RURAL AREA TELEPHONE  
AND CELLULAR SERVICE PROVIDERS  
Lukas, McGowan, Nace & Gutierrez  
1819 H Street, N.W., Seventh Floor  
Washington, D.C. 20006

Frank Michael Panek  
AMERITECH OPERATING COMPANIES  
2000 W. Ameritech Center Dr.  
Room 4H84  
Hoffman Estates, IL 60196-1025

David B. Jeppsen  
AMERICAN WIRELESS COMMUNICATION  
CORPORATION  
Keck, Mahin & Cate  
1201 New York Avenue, N.W.  
Penthouse Suite  
Washington, D.C. 20005

Melodie A. Virtue  
AMERICAN WOMEN IN RADIO AND  
TELEVISION, INC.  
1101 Connecticut Avenue, N.W.  
Suite 700  
Washington, D.C. 20036

Marilyn Mohrman-Gillis  
ASSOCIATION OF AMERICA'S PUBLIC  
TELEVISION STATIONS  
1350 Connecticut Avenue, N.W.  
Suite 200  
Washington, D.C. 20036

William J. Franklin  
ASSOCIATION OF INDEPENDENT  
DESIGNATED ENTITIES  
William J. Franklin, Chartered  
1919 Pennsylvania Avenue, N.W.  
Suite 300  
Washington, D.C. 20006-3404

Thomas J. Keller  
THE ASSOCIATION OF AMERICAN  
RAILROADS  
Verner, Liipfert, Bernhard,  
McPherson and Hand, Chartered  
901 15th Street, N.W., Suite 700  
Washington, D.C. 20005

Lee J. Tiedrich  
ASSOCIATION FOR MAXIMUM SERVICE  
TELEVISION, INC.  
Covington & Burling  
1201 Pennsylvania Ave., N.W.  
P.O. Box 7566  
Washington, D.C. 20044

James H. Barker  
BELL ATLANTIC PERSONAL  
COMMUNICATIONS, INC.  
Latham & Watkins  
1001 Pennsylvania Ave., N.W.  
Washington, D.C. 20004-2505

Jim O. Llewellyn  
BELLSOUTH CORPORATION  
1155 Peachtree Street, N.E.  
Atlanta, Georgia 30367-6000

Van R. Boyette  
P.O. Box 153  
Wise River, MT 59762

Quentin L. Breen  
3 Waters Park Drive, #231  
San Mateo, CA 94403-1144

Dennis C. Brown  
1835 K Street, N.W.  
Suite 650  
Washington, D.C. 20006

Theodore W. Wing, II  
RAY COMMUNICATIONS, INC.  
3 Bala Plaza East, Suite 101  
Bala Cynwyd, PA 19004-3840

Peter H. Feinberg  
CABLEVISION INDUSTRIES CORPORATION  
COMSAT CORPORATION, et al  
Dow, Lohnes & Albertson  
1255 23rd Street, N.W., Suite 500  
Washington, D.C. 20037

Albert H. Frazier, Jr.  
CALCELL WIRELESS, INC.  
2723 Easton Drive  
Burlingame, CA 94010

PHILIP F. Otto  
CALIFORNIA MICROWAVE, INC.  
990 Almanor Avenue  
Sunnyvale, California 94080

Massoud Ahmadi  
CALL-HER  
3 Church Circle  
Suite 233  
Annapolis, Maryland 21401

Thomas J. Casey  
CELLULAR COMMUNICATIONS, INC.  
Skadden, Arps, Slate, Meagher  
& Flom  
1440 New York Avenue, N.W.  
Washington, D.C. 20005

William J. Franklin  
CELLULAR SETTLEMENT GROUPS  
William J. Franklin, Chartered  
1919 Pennsylvania Avenue, N.W.  
Suite 300  
Washington, D.C. 20006-3404

Peter A. Casciato  
CELLULAR SERVICE, INC.  
A Professional Corporation  
1500 Sansome Street, Suite 201  
San Francisco, CA 94111

Michael F. Altschul  
CELLULAR TELECOMMUNICATIONS  
INDUSTRY ASSOCIATION  
Two Lafayette Centre, Third Floor  
1133 21st Street, N.W.  
Washington, D.C. 20036

Richard M. Tettelbaum  
CFW COMMUNICATIONS COMPANY,  
DENVER AND EPHRATA TELEPHONE  
ET. AL  
Gurman, Kurtis, Blask & Freedman,  
Chartered  
1400 16th Street, N.W., Suite 500  
Washington, D.C. 20036

Randall B. Lowe  
CENCALL COMMUNICATIONS  
CORPORATION  
Jones, Day, Reavis & Pogue  
1450 G Street, N.W.  
Washington, D.C. 20005-2088

Arthur H. Harding  
CENTURY COMMUNICATIONS  
CORPORATION  
Fleischman and Walsh  
1400 Sixteenth Street, N.W.  
Suite 600  
Washington, D.C. 20036

John A. Prendergast  
CHICKASAW TELEPHONE COMPANY  
Blooston, Mordkofsky, Jackson  
& Dickens  
2120 L Street, NW  
Suite 300  
Washington, D.C. 20037

Ellen S. Deutsch  
CITIZENS UTILITIES COMPANY  
P.O. Box 340  
8920 Emerald Park Drive, Suite C  
Elk Grove, CA 95759-0340

Thomas Gutierrez  
COALITION FOR EQUITY IN LICENSING  
Lukas, McGowan, Nace &  
Gutierrez, Chartered  
1819 H Street, N.W., 7th Floor  
Washington, D.C. 20006

James F. Ireland  
COLE, RAYWID & BRAVERMAN  
1919 Pennsylvania Avenue, NW  
Suite 200  
Washington, D.C. 20006

Nancy J. Thompson  
COMSAT MOBILE COMMUNICATIONS  
6560 Rock Spring Drive  
Bethesda, MD 20817

Richard S. Wilensk  
COMTECH ASSOCIATES, INC.  
Middleberg, Riddle & Gianna  
2323 Bryan Street  
Suite 1600  
Dallas, Texas 75201

Nancy Douthett  
CONVERGING INDUSTRIES  
P.O. Box 6141  
Columbia, MD 21045-6141

Joe D. Edge  
COOK INLET REGION, INC.  
Hopkins & Sutter  
888 16th Street, N.W.  
Washington, D.C. 20006

Milton Bins  
COUNCIL OF 100  
1129 - 20th Street, N.W.  
Suite 400  
Washington, D.C. 20036

John D. Lockton  
CORPORATE TECHNOLOGY PARTNERS  
100 S. Ellsworth Avenue  
9th Floor  
San Mateo, California 94401

Werner K. Hartenberger  
COX INTERPRISES, INC.  
Dow, Lohnes & Albertson  
1255 23rd Street, Suite 500  
Washington, D.C. 20037

Thomas Crema  
3100 P Street, N.W.  
Washington, D.C. 20007

William Dekay  
DIAL PAGE, INC.  
P. O. Drawer 10767  
Greenville, SC 29603-0767

William J. Franklin  
DEVSHA CORPORATION  
1919 Pennsylvania Avenue, N.W.  
Suite 300  
Washington, D.C. 20006-3404

J. Jeffrey Craven  
DIVERSIFIED CELLULAR  
COMMUNICATIONS  
Besozzi, Gavin & Craven  
1901 L Street, N.W., Suite 200  
Washington, D.C. 20036

Shirley S. Fujimoto  
DOMESTIC AUTOMATION COMPANY  
Keller and Heckman  
1001 G Street, N.W.  
Suite 500 West  
Washington, D.C. 20001

Harold K. McCombs, Jr.  
DUNCAN, WEINBERG, MILLER  
& PEMBROKE, P.C.  
1615 M Street, N.W.  
Suite 800  
Washington, D.C. 20036

Lee L. Selwyn  
ECONOMICS AND TECHNOLOGY, INC.  
One Washington Mall  
Boston, Massachusetts 02108-2617

Russell H. Fox  
E.F. JOHNSON COMPANY  
Gardner, Carton & Douglas  
1301 K Street, N.W.  
Suite 900, East Tower  
Washington, D.C. 20005

Margaret M. Charles  
FIBERSOUTH, INC.  
Swidler & Berlin, Chartered  
3000 K Street, N.W.  
Suite 300  
Washington, D.C. 20007

J. Jeffrey Craven  
FIRST CELLULAR OF MARYLAND, INC.  
Besozzi, Gavin & Craven  
1901 L Street, N.W., Suite 200  
Washington, D.C. 20036

Kathy L. Shobert  
GENERAL COMMUNICATIONS, INC.  
888 16th St., NW, Suite 600  
Washington, D.C. 20006

Carl W. Northrop  
GEORGE E. MURRAY  
700 13th Street, N.W.  
Suite 700  
Washington, D.C. 20005

Michael S. Hirsch  
GEOTEK INDUSTRIES, INC.  
1200 19th Street, N.W., Suite 607  
Washington, D.C. 20036

Edward C. Schmults  
GTE SERVICE CORPORATION  
One Stamford Forum  
Stamford, CT 06904

David F. Gencarelli  
1919 Pennsylvania Ave., N.W.  
Suite 300  
Washington, D.C. 20006

GVNW INC./MANAGEMENT  
7125 S.W. Hampton Street  
Suite 100  
Tigard, OR 97223

Gary M. Epstein  
HUGHES AIRCRAFT COMPANY  
Latham & Watkins  
1001 Pennsylvania Ave., N.W.  
Washington, D.C. 20004

Gary M. Epstein  
HUGHES COMMUNICATIONS GALAXY,  
INC.  
Latham & Watkins  
Suite 1300  
1001 Pennsylvania Ave., N.W.  
Washington, D.C. 20004

Michael F. Morrone  
INDEPENDENT CELLULAR CONSULTANTS  
Keller and Heckman  
1001 G Street, N.W.  
Suite 500 West  
Washington, D.C. 20001

David L. Hill  
INDEPENDENT CELLULAR NETWORK, INC.  
1919 Pennsylvania Ave., N.W.  
Suite 800  
Washington, D.C. 20006

Jack Taylor  
INTERDIGITAL COMM. CORP.  
9215 Rancho Drive  
Elk Grove, CA 95624

Mark E. Crosby  
INDUSTRIAL TELECOMMUNICATIONS  
ASSOCIATION, INC.  
1110 N. Glebe Road, Suite 500  
Arlington, VA 22201-5720

Robert B. Kelly  
INTELLIGENT VEHICLE-HIGHWAYS  
SOCIETY OF AMERICA  
Kelly, Hunter, Mow & Povich, P.C.  
1133 Connecticut Ave., N.W.  
Washington, D.C. 20036

James U. Troup  
IOWA NETWORK SERVICES, INC.  
1801 K Street, N.W.  
Washington, D.C. 20006



Coleen Egan  
JAJ CELLULAR  
Gurman, Kurtis, Blask &  
Freedman, Chartered  
1400 Sixteenth Street, N.W.  
Suite 500  
Washington, D.C. 20036

Calvin H. Johnston  
DATALINK COMMUNICATIONS  
26635 W. Agoura Road  
Suite 105  
Calabasas, CA 91302

James M. Rhoads  
JMP TELECOM SYSTEM INC.  
P.O. Box 292557  
Kettering, Ohio 45429

David L. Nace  
LIBERTY CELLULAR, INC.  
Lukas, McGowan, Nace &  
Gutierrez, Chtd.  
1819 H Street, N.W., Seventh Floor  
Washington, D.C. 20006

Linda K. Smith  
LORAL QUALCOMM SATELLITE  
SERVICES, INC.  
Crowell & Moring  
1001 Pennsylvania Ave., N.W.  
Washington, D.C. 20004

Henry A. Solomon  
THE LUXCEL GROUP. INC.  
Haley, Bader & Potts  
Suite 900  
4350 North Fairfaz Drive  
Arlington, VA 22203-1633

Scott K. Morris  
MCCAW CELLULAR COMMUNICATIONS,  
INC.  
5400 Carillon Point  
Kirkland, Washington 98033

LARRY A. Blosser  
MCI TELECOMMUNICATIONS CORPORATION  
1801 Pennsylvania Ave., N.W.  
Washington, D.C. 20006

Timothy E. Welch  
MEBTEL, INC.  
Hill & Welch  
Suite 113  
1330 New Hampshire Ave., N.W.  
Washington, D.C. 20036

Alex J. Lord  
MERCURY COMMUNICATIONS, L.C.  
236 E. 6400 S.  
Salt Lake City, UT 84107

James E. Meyers  
BARAFF, KOERNER, OLENDER &  
HOCHBERG, P.C.  
5335 Wisconsin Ave., N.W.  
Suite 300  
Washington, D.C. 20015

Henry E. Crawford  
MILLIN PUBLICATIONS, INC.  
1150 Connecticut Ave., N.W.  
Suite 900  
Washington, D.C. 20036

P. J. Mitchell  
MINORITY BUSINESS ENTERPRISE  
LEGAL DEFENSE AND EDUCATION  
FUND, INC.  
220 I Street, N.E.  
Suite 240  
Washington D.C. 20002

David J. Kaufman  
MINORITY PCS COALITION  
Brown Nietert & Kaufman, Chtd.  
1920 N Street, N.W., Suite 660  
Washington, D.C. 20036

Ann K. Newhall  
MINNESOTA EQUAL ACCESS NETWORK  
SERVICES, INC.  
4800 Norwest Center  
Minneapolis, MN 55402

Michael D. Kennedy  
MOTOROLA, INC.  
1350 I Street, N.W., Suite 400  
Washington, D.C. 20005

Philip L. Malet  
MOTOROLA SATELLITE  
COMMUNICATIONS, INC.  
1330 Connecticut Ave., N.W.  
Washington, D.C.

Gene A. Bechtel  
MW TV, INC.  
Bechtel & Cole, Chartered  
Suite 250  
1901 L Street, N.W.  
Washington, D.C. 20036

Richard S. Myers  
1030 15th Street, N.W., Suite 908  
Washington, D.C. 20005

James L. Winston  
THE NATIONAL ASSOCIATION OF  
BLACK OWNED BROADCASTERS,  
INC.  
Robin, Winston, Diercks,  
Harris & Cooke  
1730 M Street, N.W.  
Suite 412  
Washington, D.C. 20036

David E. Weisman  
NATIONAL ASSOCIATION OF  
BUSINESS AND EDUCATIONAL  
RADIO, INC.  
Meyer, Faller, Weisman and  
Rosenberg, P.C.  
4400 Jenifer Street, N.W.  
Suite 380  
Washington, D.C. 20015

Margot S. Humphrey  
THE NATIONAL RURAL TELECOM  
ASSOCIATION  
Koteen & Naftalin  
1150 Connecticut Ave., N.W.  
Suite 1000  
Washington, D.C. 20036

Alden F. Abbott  
NATIONAL TELECOMMUNICATIONS  
AND INFORMATION ADMINISTRATION  
U.S. Department of Commerce  
Room 4713  
14th and Constitution Ave., N.W.  
Washington, D.C. 20230

David Cosson  
NATIONAL TELEPHONE COOPERATIVE  
ASSOCIATION  
2626 Pennsylvania Ave., N.W.  
Washington, D.C. 20037

Robert S. Foosaner  
NEXTEL COMMUNICATIONS, INC.  
601 13th Street, N.W.  
Suite 1100 South  
Washington, D.C. 20005

Edward R. Wholl  
NYNEX CORPORATION  
120 Bloomingdale Road  
White Plains, NY 10605

Lisa M. Zaina  
THE ORGANIZATION FOR THE  
PROTECTION AND ADVANCEMENT  
OF SMALL TELEPHONE COMPANIES  
21 Dupont Circle, NW  
Suite 700  
Washington, D.C. 20036

David L. Nace  
PACIFIC TELECOM CELLULAR,  
INC.  
Lukas, McGowan, Nace &  
Gutierrez, Chtd.  
1819 H Street, N.W., Seventh Floor  
Washington, D.C. 20006

Pamela J. Riley  
PACTEL CORPORATION  
2999 Oak Road, MS 1050  
Walnut Creek, CA 94596

Carl W. Northrop  
PACTEL PAGING &  
MIDCONTINENT MEDIA  
700 13th Street, N.W.  
Suite 700  
Washington, D.C. 20005

Susan E. Ryan  
PAGEMART, INC.  
Paul, Weiss, Rifkind, Wharton  
& Garrison  
1615 L Street, N.W.  
Suite 1300  
Washington, D.C. 20036

Michael Wack  
PAGING NETWORK, INC.  
Reed Smith Shaw & McClay  
1200 18th Street, N.W.  
Washington, D.C. 20036

Gerald S. McGowan  
PALMER COMMUNICATIONS, INC.  
Lukas, McGowan, Nace &  
Gutierrez, Chartered  
1819 H Street, N.W., Seventh Floor  
Washington, D.C. 20006

Stephen Curtin  
PERSONAL COMMUNICATIONS NETWORK  
SERVICES OF NEW YORK  
17 Battery Place, Suite 1200  
New York, NY 10004-1256

Richard L. Vega, Jr.  
Phase One Communications, Inc.  
3452 Lake Lynda Drive, #115  
Orlando, Florida 32817

John W. Hunter  
PMN, INC.  
McNair & Sanford, P.A.  
1155 Fifteenth Street  
Washington, D.C. 20005

Richard M. Tettelbaum  
PNC CELLULAR, INC.  
Gurman, Kurtis, Blask &  
Freedman, Chartered  
1400 16th Street, N.W.  
Suite 500  
Washington, D.C. 20036

John Hearne  
POINT COMMUNICATIONS COMPANY  
100 Wilshire Blvd., Suite 1000  
Santa Monica, CA 90401

Howard M. Liberman  
PRIMOSPHERE LIMITED  
PARTNERSHIP  
Arter & Hadden  
1801 K Street, N.W.  
Suite 400K  
Washington, D.C. 20006

Peter Tannewald  
RADIO TELECOM AND TECHNOLOGY  
INC.  
Arent Fox Kintner and Kahn  
1050 Connecticut Ave., N.W.  
Washington, D.C. 20036-5339

Daniel S. Goldberg  
RAM MOBILE DATA USA  
LIMITED PARTNERSHIP  
Golberg, Godles, Wiener &  
Wright  
1229 Nineteenth Street, N.W.  
Washington, D.C. 20036

Michael J. Shortley, III  
ROCHESTER TELEPHONE CORPORATION  
180 South Clinton Avenue  
Rochester, New York 14646

Robert H. Kyle  
SMALL BUSINESS PCS ASSOCIATION  
96 Hillbrook Drive  
Portola Valley, CA 94028

John A. Prendergast  
ROCKY MOUNTAIN TELECOMMUNICATIONS  
ASSOCIATION, ET AL  
Blooston, Mordkofsky, Jackson  
& Dickens  
2120 L Street, NW  
Suite 300  
Washington, DC 20037

Charles D. Cosson  
SMALL TELEPHONE COMPANIES  
OF LOUISIANA  
Kraskin & Associates  
2120 L Street, N.W.  
Suite 810  
Washington, D.C. 20037

David L. Jones  
RURAL CELLULAR ASSOCIATION  
2120 L Street, N.W., Suite 810  
Washington, D.C. 20037

David R. Smith  
ALEXANDER, GEBHARDT, APONTE &  
MARKS  
Lee Plaza - Suite 805  
8601 Georgia Avenue  
Silver Spring, Maryland 20910

Ann K. Newhall  
RURAL CELLULAR CORPORATION  
4800 Norwest Center  
Minneapolis, MN 55402

David J. Kaufman  
SMALL RSA OPERATORS  
Brown Nietert & Kaufman, Chtd.  
1920 N Street, N.W., Suite 660  
Washington, D.C. 20036

William J. Franklin  
ROAMER ONE, INC.  
1919 Pennsylvania Ave., N.W.  
Suite 300  
Washington, D.C. 20006-3404

Paula J. Fulks  
SOUTHWESTERN BELL CORPORATION  
175 E. Houston, Room 1218  
San Antonio, TX 78205

John D. Pellegrim  
ROBERT LUTZ, ET AL  
1140 Connecticut Ave., N.W.  
Suite 606  
Washington, D.C. 20036

Jay C. Keithley  
SPRINT CORPORATION  
1850 M Street N.W.  
Suite 1100  
Washington, D.C. 20036

A. Thomas Carroccio  
SANTARELLI, SMITH & CARROCCIO  
1155 Connecticut Ave., N.W.  
Washington, D.C. 20036

Ellen S. Levine  
PUBLIC UTILITIES COMMISSION OF  
THE STATE OF CALIFORNIA  
505 Van Ness Ave., Room 5028  
San Francisco, CA 94102

Robert B. Kelly  
SECURICOR PMR SYSTEMS LTD.  
Kelly, Hunter, Mow & Povich,  
P.C.  
1133 Connecticut Ave., N.W.  
Washington, D.C. 20036

Stephan C. Sloan  
170 Westminster Street,  
Suite 701  
Providence, RI 02903

Michael R. Gardner  
SUITE 12 GROUP  
1150 Connecticut Ave., NW  
Suite 710  
Washington, D.C. 20036

Roy L. Hayes  
SYSTEM ENGINEERING, INC.  
1851 Alexander Bell Drive, #104  
Reston, VA 22091

Timothy A. Hoffman  
TELEPHONE ASSOCIATION OF  
MICHIGAN  
Brown Nietert & Kaufman, Chtd.  
1920 N Street. N.W.  
Suite 660  
Washington, D.C. 20036

George Y. Wheeler  
TELEPHONE AND DATA SYSTEMS,  
INC.  
Koteen & Naftalin  
1150 Connecticut Ave., NW  
Suite 1000  
Washington, D.C. 20036

James U. Troup  
TELEPHONE ELECTRONICS  
CORPORATION  
1801 K Street, N.W.  
Washington, D.C. 20006

Gustave Tappe  
TELEPOINT PERSONAL  
COMMUNICATIONS, INC.  
405 Broad Avenue  
Palisades Park, New Jersey 07650

Thomas A. Stroup  
TELOCATOR, THE PERSONAL  
COMMUNICATIONS INDUSTRY  
ASSOCIATION  
1019 19th Street, N.W.  
Washington, D.C. 20036

Timothy E. Welch  
THUMB CELLULAR LIMITED  
PARTNERSHIP  
Dean George Hill & Welch  
Suite #113  
1330 New Hampshire Ave., N.W.  
Washington, D.C. 20036

Stuart F. Feldstein  
TIME WARNER TELECOMMUNICATIONS  
Fleischman and Walsh  
1400 Sixteenth Street, N.W.  
Suite 600  
Washington, D.C. 20036

Richard S. Becker  
TRI-STATES RADIO COMPANY  
Becker & Madison, Chartered  
1915 Eye Street, Northwest  
Eighth Floor  
Washington, D.C. 20006

Norman P. Leventhal  
TRW, INC.  
Leventhal, Senter & Lerman  
2000 K Street, N.W.  
Suite 600  
Washington, D.C. 20006

Terrence P. McGarty  
THE TELMARC GROUP, INC. &  
TELMARC TELECOMMUNICATIONS,  
INC.  
24 Woodbine Rd  
Florham Park, NJ 07932

J. Jeffrey Craven  
UNIQUE COMMUNICATIONS CONCEPTS  
Besozzi, Gavin & Craven  
1901 L Street, N.W., Suite 200  
Washington, D.C. 20036

James L. Bradley  
UNITED NATIVE AMERICAN  
TELECOMMUNICATIONS, INC.  
1604 Sandy Lane  
Burlington, Washington 98233-3400

Robert Cook  
U. S. INTELCO NETWORKS, INC.  
P. O. Box 2909  
Olympia, Washington 98507

Martin T. McCue  
UNITED STATES TELEPHONE  
ASSOCIATION  
900 19TH Street, N.W.  
Washington, D.C. 20006-2105

Jeffrey L. Sheldon  
UTILITIES TELECOMMUNICATIONS  
COUNCIL  
1140 Connecticut Ave., N.W.  
Suite 1140  
Washington, D.C. 20036

Paul C. Besozzi  
VANGUARD CELLULAR SYSTEMS, INC.  
Besozzi, Gavin & Craven  
1901 L Street, N.W. Suite 200  
Washington, D.C. 20036

Thomas Gutierrez  
WENDY C. COLEMAN D/B/A  
WCC CELLULAR  
Lukas, McGowan, Nace & Gutierrez  
1819 H. Street, N.W., 7th Floor  
Washington, D.C. 20006

Sheila S. Hollis  
WINDSONG COMMUNICATIONS, INC.  
Metzger, Hollis, Gordon & Mortimer  
1275 K Street, N.W., Suite 1000  
Washington, D.C. 20005

Paul J. Sinderbrand  
THE WIRELESS CABLE ASSOCIATION  
INTERNATIONAL, INC.  
Sinderbrand & Alexander  
888 Sixteenth Street, N.W.  
Suite 610  
Washington, D.C. 20006-4103

Mary C. Metzger  
WIRELESS SERVICES CORPORATION  
127 Richmond Hill Road  
New Canaan, CT 06840

George Benson  
WISCONSIN WIRELESS  
N. 615 Communication Dr.  
Suite 2  
Appleton, WI 54915

William E. Zimsky  
P. O. Box 3005  
Durango, CO 81302

M. Kathleen O'Connor  
2139 Newport Place, N.W.  
Washington, D.C. 20037

Derwood S. Chase  
CHASE COMMUNICATIONS CORP.  
300 Preston Ave., Ste. 403  
Charlottesville, VA 22902-5091

Daniel R. Lindemann  
32 Sleepy Hollow Drive  
Wayne, New Jersey 07470

James F. Stern  
2542 North 96th Street  
Wauwatosa, Wisconsin 53226

Leslie R. Walls  
7112 Terry Lane  
Falls Church, Virginia 11042

John J. Mandler  
1030 N. Monroe Street  
Arlington, Virginia 22201

Michael R. Rickman  
7140 Gammwell Drive  
Cincinnati, Ohio 45230

David M. Cohen  
220 West 98th Street  
Apartment 11H  
New York, New York 10025

Steven L. Dickerson  
Suite 4300  
901 Main Street  
Dallas, Texas 75202

Mark H. Duesenberg  
1300 I Street, N.W.  
Suite 900 West  
Washington, D.C. 20005

Laura G. Dooley  
1655 Tippecanoe Court  
Valparaiso, IN 46383

Christopher K. Sandberg  
FIRSTCOM, INC.  
2200 Washington Square  
100 Washington Avenue South  
Minneapolis, Minnesota 55401

James Aidala  
6278 Gentle Lane  
Alexandria, VA 22310

Thomas J. Jasien  
4659A South 28th Road  
Arlington, VA 22206

John Dudinsky, Jr.  
305 East Capiton Street, S.E.  
Washington, D.C. 20003

Henry E. Crawford  
MILLIN PUBLICATIONS, INC.  
1150 Connecticut Ave., N.W.  
Suite 900  
Washington, D.C. 20036

James Love  
TAXPAYER ASSETS PROJECT  
P.O. Box 19367  
Washington, D.C. 20036

Peter Tannenwald  
RADIO TELECOM AND TECHNOLOGY  
INC.  
Arent Fox Kintner and Kahn  
1050 Connecticut Ave., N.W.  
Washington, D.C. 20036-5339

Oye Ajayi-Obe  
1521 Heather Hollow Circle  
Suite 21  
Silver Spring, MD 20904

Henry J. Staudinger  
RT 1, Box 245  
Toms Brock, VA 22660

Charles N. Andreae, III  
1133 Connecticut Ave., N.W.  
Suite 700  
Washington, D.C. 20036

Thomas Crema  
310 P Street, N.W.  
Washington, D.C. 20007

Abby Dilley  
6278 Gentle Lane  
Alexandria, VA 22310

David F. Gencarelli  
1919 Pennsylvania Ave., N.W.  
Suite 300  
Washington, D.C. 20006

Charles K. Alexander  
IEEE-USA  
1828 L Street, N.W.  
Suite 1202  
Washington, D.C. 20036-5104

Arlene F. Strege  
117 Howell Dr.  
Somerville, NJ 08875

Ward Leber  
18552 MacArthur Blvd.  
Suite 200  
Irvine, CA 92715

Eroca Daniel  
220 E. Wilbur Rd. #A  
Thousand Oaks, CA 91359

Thomas J. Jasien  
4659A South 28th Road  
Arlington, VA 22206



# Replies to Comments on PCS Auction Design

*by* PAUL MILGROM AND ROBERT WILSON

1. We have read through many of the comments on the NPRM concerning auction design, particularly those supported by expert statements. After reviewing these, we continue to believe that the design we proposed in our initial comments, with the possible addition of an activity rule as described in section III, constitutes the best design for conducting the spectrum auction. Our simultaneous-auctions design, in comparison to designs that auction licenses sequentially, provides much more useful information to bidders during the auction process and frees bidders from having to guess about the likely prices of licenses to be auctioned later. This simultaneous feature also makes combinatorial bidding unnecessary for bidders who wish to aggregate licenses geographically within the same band to form a network. The exclusion of combinatorial bids avoids biases inherent in the NPRM design and reduces the scope for strategic manipulation of the auction process.

2. This reply is organized by issue, rather than by commenter. Our intention is that this organization will assist the Commission in making substantive decisions about the various details of the PCS auction design.

## **I. Combinatorial Bidding**

3. The auction design proposed in the NPRM called for ascending bid auctions for each individual license combined with combinatorial bidding for certain specified collections of licenses, including the collection of all licenses in spectrum band A and the collection of all licenses in band B. The commenters on the Commission's NPRM take a variety of positions in

regard to combinatorial bidding, ranging from those who endorse the NPRM's proposed treatment of these bids (including MCI, General Communications and Bell Atlantic), those who favor allowing bids on any combinations of licenses (including NTIA and Nextel), those who favor some other system of combinatorial bids on limited sets of licenses (including CTIA and Nynex) and those who oppose any system of combinatorial bids (including Pacific Bell and Nevada Bell, PacTel, AT&T, McCaw, Telocator, and Sprint).

4. We are among those who oppose any form of combinatorial bidding. As we argued in our initial comments, combinatorial bidding creates an inefficient bias in favor of the combinatorial bidders and, as a practical matter, requires that the Commission determine in advance which combinations would be favored. The Commission's proposal to use combinatorial bids for national aggregations of licenses draws predictable support from MCI, whose interests are so well served by such a bias that it advocates that the system be expanded to include nationwide combinatorial bids on BTAs as well as MTAs.<sup>1</sup> The national bidders that provide cellular services and that would be prevented from bidding on national MTA licenses, as well as the likely regional bidders, tend to oppose this system. This pattern of support is consistent with our analysis of the nature of the bias introduced by combinatorial bidding.

5. Some of the commenters have proposed alternative auction designs that still incorporate some form of combinatorial bidding for national bidders. All of the proposed designs are biased in favor of the national combinatorial bidders, though the severity of the bias does

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<sup>1</sup>They also propose to increase the bias by using a second price rule, which is similar to allowing the national bidders to move second, raising their bids as much as necessary to defeat the bids of the subnational bidders. No such opportunity, however, would be afforded to the subnational bidders.

vary among the proposals. We consider several of these proposals below, showing how each is flawed.

6. The CTIA proposal entails a round of combinatorial bidding followed by a sequence of oral auctions, in much the same fashion as the NPRM proposal. The key difference would be that the combinatorial bid would be opened before conducting the sequence of individual oral auctions. This proposal would have two advantages over the original NPRM proposal. First, it would increase the competition for individual licenses by making those national bidders that failed to submit winning national bids more active participants. In the original proposal, the national bidders who had lost the sealed bid round would remain unaware of that fact and might be reluctant to "bid against themselves" by competing in the oral auctions. Second, the CTIA proposal would remove one significant barrier to the coordination of bids by the subnational bidders, since it would provide them with a fixed total bid target for which to aim. By reducing uncertainty among subnational bidders about how much they would need to bid to defeat the national leader, this design could, in principle, make cooperation easier. This would be especially so if there were only, say, two subnational bidders for the band in question, who might then be better able to estimate their "fair shares" of the total national bid in order to defeat the national bidder. Even in this two bidder case, which is the most favorable one for evaluating the CTIA design, there is a significant chance that the bidders might fail to coordinate their bids and lose the auction when efficiency dictates that they should win.

7. A much worse scenario for the CTIA design would arise if there were several subnational firms among the winning bidders, as might happen if LECs or local cable companies were the high value bidders. Consider, for example, what would happen after the combinatorial

bids were opened for, say, band A and the bidding then began on the first MTA in the band. After the competition had dropped out, how much further could one expect the subnational bidder to increase its bid in hopes of ensuring that the eventual total of the subnational bids would defeat the national leader?

8. To restate the issue in the language of the "free rider problem" described in our initial comments, the question is: How much would the bidder "contribute" to a fund to defeat the national bidder? In economic terms, any bid that the bidder may make in excess of the minimum needed to be the highest bidder for that license is a "contribution" to such a fund. The economic analysis that follows from this identification is completely standard. In this case, the bidder does not know how much contribution will be needed in total, or indeed whether any contribution will be needed at all. From the bidder's point of view, any excess contribution is a simple donation from its treasury to the federal treasury. Moreover, the bidder knows that even if it doesn't contribute its "fair share" toward defeating the national bidder by raising its own bid above the minimum needed to win, the highest bidders on the last MTAs in band A will be under tremendous pressure to make up the shortfall if they can. Consequently, the bidder can try to take a "free ride," leaving the problem of defeating the national bidders to later bidders by making little or no contribution to the "fund." With some subnational bidders thus withholding their participation in the fund, the national bidder is too likely to win, relative to the dictates of efficiency.

9. This is the same free rider problem found in the original NPRM proposal, but in a slightly different guise. In this version, however, in addition to the inefficiency, there is also a significant inequity. The rules make it highly likely that even if the subnational bidders were to

succeed in raising their total bids to defeat the national bidder, the burden of defeating the national bidder will fall disproportionately on the final bidders in the sequence. The issue of sequencing is already a disputatious issue among the bidders, and the CTIA rule would add another reason for dispute. To summarize: the CTIA proposal compounds the problem of the original NPRM design by introducing both inefficiency and inequity into the auction design.

10. Variations of the CTIA proposal, such as holding another round of bidding after the oral auctions are concluded, are virtually equivalent to the second round proposal of the NPRM design. We explained in our previous comments why that arrangement would be vulnerable to the free rider problem and would promote biased and inefficient outcomes.

11. Another kind of proposal that has been made to enhance the workability of combinatorial bids is to allow all combinations to be subject to bidding, rather than just national combinations. Nextel makes one such proposal, without giving much detail about how its proposed system would work. Our initial comment explained that, with unlimited combinatorial bidding, the auction would lose its transparency. It would take a computer to consider the sums of bids of various combinations in order to identify the winners. There could be dispute as to whether the computer had been programmed correctly and the winners properly identified, leading to unnecessary litigation. The auction would be immensely complicated, and the problem of determining a bidding strategy would involve so much guesswork about others' bids that an efficient outcome would be unlikely. This ill-considered and incompletely specified proposal should be rejected out of hand.

12. A more thoughtful proposal for combinatorial bidding is the one included in the comment by NTIA. This proposal includes a simultaneous ascending bid design much like the

one that we have proposed, but with allowance for combinatorial bids. This design is intended to reduce the risk to bidders for any collection of licenses—not just national collections—by ensuring that they are not forced to buy an individual MTA license at a price reflecting its value as part of a network if they are ultimately unable to acquire other parts of the network. As we shall explain below, the design we have proposed provides a substantial degree of protection against the same risk, but without any need to rely on combinatorial bids.

13. Like the Nextel proposal, the NTIA auction shares the problem of lacking transparency, making it more likely that there will be disputes about whether the auction has been properly conducted. Also, like the Nextel proposal, the NTIA proposal is complicated and offers opportunities for subtle strategies by both national and subnational bidders that could undermine its effectiveness. The unexplored possibilities for strategic manipulation in this auction combined with the very large sums at stake, which provide the incentive for bidders to explore those possibilities, make it dangerous to experiment with it in this context. Finally, the random stopping rule built into the NTIA proposal is arbitrary and increases the likelihood that the auction may stop before an efficient allocation of licenses has been realized.

14. To illustrate the strategic possibilities opened by the NTIA proposal, consider the case of a bidder who wishes to form a national license. Early in the auction, before there has been much active bidding on the individual MTA licenses, the national bidder might make a preemptive combinatorial bid for all the licenses in one band, say band A. Under the proposed NTIA system as we understand it (it is not completely described), the system would respond by informing bidders on the individual MTAs of the amount by which the preemptive national bid exceeds the sum of the individual MTA bids. If some bidders will raise their bids to defeat the

national bidder, the auction can continue. But which bidders should raise their bids, and by how much? There is little information to guide the bidders in such a circumstance. Individual bidders will be relegated to using rules of thumb to guess what is required of each of them to defeat the national bid. Some may hold out in hopes that other bidders will make good the shortfall. In short, we have another free rider problem, in this case intensified by the lack of information among bidders about the likely prices of individual MTA licenses. It is even possible that the national bidder could acquire the national license for a price less than the sum of the second highest values on the individual licenses, compounding a substantial inefficiency with a significant loss of revenue to the Treasury. While it is no doubt possible to change the rules to eliminate this particular problem, any complex design like that proposed by the NTIA leaves room for strategic bidding to gain advantages for individual bidders at the expense of overall efficiency.

15. Closely related to the NTIA proposal is the Nynex proposal, which also calls for simultaneous auctions by ascending bid of all licenses, either within a band or in all bands together. Unlike the NTIA proposal, however, this proposal would limit the set of permissible combinatorial bids, in order to eliminate the earlier described transparency problem. However, any such proposal would inevitably favor those specific carriers for whom the particular allowed combinations of licenses are especially valuable. If national combinatorial bids were permitted, the design would be vulnerable to the same sort of preemptive bids by national bidders that we described in the previous paragraph.

16. We understand that those favoring national combinatorial bids argue that some such system is necessary to assist national bidders in aggregating licenses. They argue that, due to

value interdependencies, national licenses within a single band are much more valuable than any smaller assemblage of licenses. They argue further that, without combinatorial bidding, it would be too risky to try to assemble a national aggregate of licenses in one band during the initial auction, because one might succeed only in acquiring a collection of licenses that are insufficient to form a national network. Finally, they argue that it would be too hard to complete the network of licenses in the secondary market, due to the hold up problem, in which the holders of a few, say, MTA licenses in a spectrum block hold out for high prices for their parts of the national network.

17. There are two basic mistakes in the foregoing argument. The first is based on a fundamental misperception of the role that secondary markets can and should play. With an auction design such as we have proposed, licenses will not be aggregated in the secondary market. On the contrary, licenses will be aggregated in the auction itself, and one major role of the secondary market will be to allow those who have failed to acquire the licenses in the same band in adjacent geographical areas to sell their licenses, for example to the holders of licenses in adjacent areas. Since the price paid for licenses in the auction need not be more than just one bid increment higher than the amount another bidder was willing to pay, the auction prices will probably be close to the prices that prevail in the secondary market immediately following the auction. Moreover, with our proposed auction design, a bidder need not commit to forming a national aggregation of licenses and thereby expose itself to any risk until the prices have substantially stabilized. This fact, together with the likelihood that secondary market prices will be close to the auction prices, greatly limits the risk of bidders who fail to assemble their intended collections of licenses.



18. The second mistake concerns the extreme view of national license "value interdependencies" that some analysts may take. Value interdependencies of various kinds may be present among PCS licenses. Perhaps motivating the national combinatorial bidding proposal is the observation that some providers will wish to provide "roaming" services, so that the telephone service purchased continues to be usable wherever the subscriber travels. This is a valuable service, and many customers would pay extra to have it compared to services that are restricted to a single MTA. This is one source of value interdependencies in the licenses. However, even if a national bidder acquires most, but not all, of the MTAs in a band, it could still provide a substantial roaming service, though not a fully national one. This is not an all-or-nothing proposition, and most customers would pay nearly as much for a nearly national service as for a fully national service.<sup>2</sup> It is possible that the total value of licenses to bidders is maximized by some such nearly national system, but with a few individual MTA licenses in the band held by companies that can take advantage of other types of economies of scope, such as the economies that arise by taking advantage of their existing fibre optic networks or other fixed investments.

19. The exaggeration of national value interdependencies also excludes the case of certain companies with cellular affiliates. When those affiliates make the company ineligible to bid in selected MTAs, the company's most preferred collection of licenses may be one that spans large portions of the country but excludes geographic areas where they are ineligible to bid. The

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<sup>2</sup>This point is echoed in the remarks of Robert Weber, the expert assisting Telephone and Data Systems, Inc., who remarks on page 6 of his report that "At the margin, any economies of scale reaped from a nationwide license would be equally well reaped from a license excluding a single MTA..."